WHAT IS CLAIMED IS:

1. A method for terminating profile sweeps for multiple bodies in a computer-implemented solid modeling system, comprising:

(a) generating a planar profile of one or more curves;

(b) sweeping the profile along a specified path to generate a tool body; and

(c) terminating the swept profile when the tool body interacts with a plurality of blank bodies to a predefined extent.

2. The method of claim 1, wherein the terminating step (c) comprises:

(1) performing a pre-processing phase to create a cellular topology graph of the tool and blank bodies;

(2) performing an analysis phase to extract tool and blank graphs from the cellular topology graph; and

(3) performing a post-processing phase to integrate results from the extracted tool and blank graphs.

3. The method of claim 2, wherein the pre-processing phase labels faces and edges of the tool and blank bodies.

4. The method of claim 3, wherein the pre-processing phase tracks which faces came from which body.

5. The method of claim 3, wherein the pre-processing phase propagates edge attributes for each face of a sheet.

6. The method of claim 3, wherein the faces and edges are labeled with attributes.

7. The method of claim 2, wherein the pre-processing phase constructs a blank body.

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8.   The method of claim 2, wherein the pre-processing phase performs cellular decomposition on the tool body and blank body to create the cellular topology graph.

9.   The method of claim 2, wherein the analysis phase adds termination vertices to the tool graph.

10.   The method of claim 2, wherein the analysis phase derives bundle graphs from the tool graph that are used to determine the potential "from" and "to" terminations.

11.   The method of claim 2, wherein the analysis phase performs label propagation in which marking of faces as a from-face or to-face are propagated to faces adjacent to those faces originally marked as from-faces and to-faces.

12.   The method of claim 2, wherein the analysis phase handles a specific termination type relative to the bodies.

13.   The method of claim 2, wherein an output of the analysis phase is a graph whose vertices represent cells that are used to create an output body.

14.   The method of claim 2, wherein the post-processing phase integrates results from the analysis phase according to the Boolean operation.

15.   The method of claim 14, wherein the results comprise a truncated tool body computed as a union of cells of the tool body.

16.   The method of claim 14, wherein the results comprise a truncated tool body computed from the Boolean operation of the tool body with a target body.

17.   The method of claim 14, wherein the results comprise a truncated tool body computed from the Boolean operation of the tool body with the blank body created in the pre-processing step.

18.   The method of claim 1, wherein the tool body interacts with the blank bodies according to one or more Boolean operations selected from a group comprising a joining operation of the tool body with one or more of the blank bodies, a cutting operation of the tool body from one or more of the blank bodies, and an intersecting operation of the tool body with one or more of the blank bodies.

19.   The method of claim 1, wherein the predefined extent is selected from a group comprising:

(1) Distance, wherein the tool body is generated by sweeping the profile, and the tool body extends to a predefined length;

(2) All, wherein the tool body extends through the blank body, but no further;

(3) To-next, wherein the tool body extends to a first face on the blank body, wherein the first face completely cuts the tool body;

(4) To-face, wherein the tool body extends up to, but does not penetrate, a selected face; and

(5) From-to, wherein the tool body is swept between two selected faces.

20.   An apparatus for terminating profile sweeps for multiple bodies, comprising:

(a) a computer; and

(b) a solid modeling system, executed by the computer, having logic for:

(1) generating a planar profile of one or more curves;

(2) sweeping the profile along a specified path to generate a tool body; and

(3) terminating the swept profile when the tool body interacts with a plurality of blank bodies to a predefined extent.

21.   The apparatus of claim 20, wherein the logic for terminating (3) comprises:

(i) logic for performing a pre-processing phase to create a cellular topology graph of the tool and blank bodies;

(ii) logic for performing an analysis phase to extract tool and blank graphs from the cellular topology graph; and

(iii) logic for performing a post-processing phase to integrate results from the extracted tool and blank graphs.

22. The apparatus of claim 21, wherein the pre-processing phase labels faces and edges of the tool and blank bodies.

23. The apparatus of claim 22, wherein the pre-processing phase tracks which faces came from which body.

24. The apparatus of claim 22, wherein the pre-processing phase propagates edge attributes for each face of a sheet.

25. The apparatus of claim 22, wherein the faces and edges are labeled with attributes.

26. The apparatus of claim 21, wherein the pre-processing phase constructs a blank body as a target body.

27. The apparatus of claim 21, wherein the pre-processing phase performs cellular decomposition on the tool body and blank body to create the cellular topology graph.

28. The apparatus of claim 21, wherein the analysis phase adds termination vertices to the tool graph.

29. The apparatus of claim 21, wherein the analysis phase derives bundle graphs from the tool graph that are used to determine the potential "from" and "to" terminations.

30. The apparatus of claim 21, wherein the analysis phase performs label propagation in which marking of faces as a from-face or to-face are propagated to faces adjacent to those faces originally marked as from-faces and to-faces.

31.   The apparatus of claim 21, wherein the analysis phase handles a specific termination type relative to the bodies.

5   32.   The apparatus of claim 21, wherein an output of the analysis phase is a graph whose vertices represent cells that are used to create an output body.

33.   The apparatus of claim 21, wherein the post-processing phase integrates results from the analysis phase according to the Boolean operation.

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34.   The apparatus of claim 33, wherein the results comprise a truncated tool body computed as a union of cells of the tool body.

35.   The apparatus of claim 33, wherein the results comprise a truncated tool
15   body computed from the Boolean operation of the tool body with a target body.

36.   The apparatus of claim 33, wherein the results comprise a truncated tool body computed from the Boolean operation of the tool body with the blank body created in the pre-processing step.

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37.   The apparatus of claim 20, wherein the tool body interacts with the blank bodies according to one or more Boolean operations selected from a group comprising a joining operation of the tool body with one or more of the blank bodies, a cutting operation of the tool body from one or more of the blank bodies, and an intersecting operation of the
25   tool body with one or more of the blank bodies.

38.   The apparatus of claim 20, wherein the predefined extent is selected from a group comprising:
       (1) Distance, wherein the tool body is generated by sweeping the profile, and the tool
30   body extends to a predefined length;
       (2) All, wherein the tool body extends through the blank body, but no further;

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(3) To-next, wherein the tool body extends to a first face on the blank body, wherein the first face completely cuts the tool body;

(4) To-face, wherein the tool body extends up to, but does not penetrate, a selected face; and

5   (5) From-to, wherein the tool body is swept between two selected faces.

39.   An article of manufacture embodying logic for terminating profile sweeps for multiple bodies in a computer-implemented solid modeling system, the logic comprising:

(a) generating a planar profile of one or more curves;

10   (b) sweeping the profile along a specified path to generate a tool body; and

(c) terminating the swept profile when the tool body interacts with a plurality of blank bodies to a predefined extent.

40.   The article of manufacture of claim 39, wherein the terminating step (c)
15 comprises:

(1) performing a pre-processing phase to create a cellular topology graph of the tool and blank bodies;

(2) performing an analysis phase to extract tool and blank graphs from the cellular topology graph; and

20   (3) performing a post-processing phase to integrate results from the extracted tool and blank graphs.

41.   The article of manufacture of claim 40, wherein the pre-processing phase labels faces and edges of the tool and blank bodies.

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42.   The article of manufacture of claim 41, wherein the pre-processing phase tracks which faces came from which body.

43.   The article of manufacture of claim 41, wherein the pre-processing phase
30 propagates edge attributes for each face of a sheet.

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44. The article of manufacture of claim 41, wherein the faces and edges are labeled with attributes.

45. The article of manufacture of claim 40, wherein the pre-processing phase constructs a blank body as a target body.

46. The article of manufacture of claim 40, wherein the pre-processing phase performs cellular decomposition on the tool body and blank body to create the cellular topology graph.

47. The article of manufacture of claim 40, wherein the analysis phase adds termination vertices to the tool graph.

48. The article of manufacture of claim 40, wherein the analysis phase derives bundle graphs from the tool graph that are used to determine the potential "from" and "to" terminations.

49. The article of manufacture of claim 40, wherein the analysis phase performs label propagation in which marking of faces as a from-face or to-face are propagated to faces adjacent to those faces originally marked as from-faces and to-faces.

50. The article of manufacture of claim 40, wherein the analysis phase handles a specific termination type relative to the bodies.

51. The article of manufacture of claim 40, wherein an output of the analysis phase is a graph whose vertices represent cells that are used to create an output body.

52. The article of manufacture of claim 40, wherein the post-processing phase integrates results from the analysis phase according to the Boolean operation.

53.   The article of manufacture of claim 52, wherein the results comprise a truncated tool body computed as a union of cells of the tool body.

54.   The article of manufacture of claim 52, wherein the results comprise a truncated tool body computed from the Boolean operation of the tool body with a target body.

55.   The article of manufacture of claim 52, wherein the results comprise a truncated tool body computed from the Boolean operation of the tool body with the blank body created in the pre-processing step.

56.   The article of manufacture of claim 39, wherein the tool body interacts with the blank bodies according to one or more Boolean operations selected from a group comprising a joining operation of the tool body with one or more of the blank bodies, a cutting operation of the tool body from one or more of the blank bodies, and an intersecting operation of the tool body with one or more of the blank bodies.

57.   The article of manufacture of claim 39, wherein the predefined extent is selected from a group comprising:
        (1) Distance, wherein the tool body is generated by sweeping the profile, and the tool body extends to a predefined length;
        (2) All, wherein the tool body extends through the blank body, but no further;
        (3) To-next, wherein the tool body extends to a first face on the blank body, wherein the first face completely cuts the tool body;
        (4) To-face, wherein the tool body extends up to, but does not penetrate, a selected face; and
        (5) From-to, wherein the tool body is swept between two selected faces.